In page 11, I assumed the existence of a solar term, with a coefficient which I called M, and which I supposed to exercise an influence on the lunar motions. I was not justified in this assumption, and I withdraw it entirely.

It is necessary now to modify the text of some of the following sections, and to substitute in several places new piles of figures for those which I had furnished. The work will be considerable, and must be done, in a great measure, by myself. However, I have already taken some steps for effecting it. I can only report at present that page 11 is to be entirely expunged. But I hope this day to give instructions to computers.

The White House, Croom's Hill, Greenwich Park:
1888, *March* 23.

Orbit of the Binary Star λ *Ophiuchi.* By Professor S. Glasenapp.

(*Communicated by E. Dunkin, F.R.S.*)

The observations of this binary star, made by several observers during the last sixty-two years, show a direct motion for the component. This motion can be easily seen from the following measurements which we select from a long series of observations :—

Epoch.	θ	σ	Observer.
1825·51	331°·4	0″·8	W. Struve.
1828·64	341·3	0·8	J. Herschel, W. Struve.
1840·55	357·9	1·0	O. Struve, Bishop.
1853·52	13·3	1·3	O. Struve, Dawes, Smyth.
1861·61	20·9	1·3	O. Struve, Mädler.
1868·57	27·1	1·4	O. Struve, Dunér, Dembowski, Main.
1877·51	33·6	1·5	O. Struve, Dembowski, Jedrzejewicz, Doberck.
1886·58	42·0	1·5	A. Hall, Jedrzejewicz.

Now the observations of W. Herschel (*Phil. Trans.* 1804, Part II. p. 374) :—

1783·18	75°·5	±0″·50
1802·39	69°·3	—

indicate a retrograde motion of about 6° in 19 years; therefore it is evident that one of these observations or both of them are erroneous. Several astronomers have tried to restore these observations, and have supposed that the true measurements may be read as follows :—

Year.	W. Struve.	Mädler, Hind, Dawes.	O. Struve.	R. Engelmann.	Flammarion.
1783	255°·5	75°·5	75°·5	205°·5	284°·5
1802	69·3	249·3	110·7	249·3	290·7

As these observations are of great value in the investigation of the orbit of λ *Ophiuchi*, I believe that the following considerations may throw some light on the true positions of the component star in these observations.

I find that W. Herschel's original observations are noted as follows:—

For 1783 ... ... 14° 30′ *nf* ($\theta = 75°·50$)
For 1802 ... ... 20° 41′ *sf* ($\theta = 110°·7$)

and that the angles are counted from the parallel-circle. If we suppose that only an error in writing has occurred in the entry of the observations, and that instead of *nf* we could put *sf*, or *np*, or *sp*, we should obtain for each epoch four positions of the component star; one of these will be the true observation. These values are the following:—

If we write *nf* we shall have 75°·5 for 1783; 69°·3 for 1802.
„ *sf* „ 104·5 „ 110·7 „
„ *sp* „ 255·5 „ 249·3 „
„ *np* „ 284·5 „ 290·7 „

As we do not know which of these four values for each epoch is the true one, we may suppose that the true observations are included in the following 16 combinations of the preceding angles:—

No.	1783.	1802.	No.	1783.	1802.
	°	°		°	°
1	75·5	69·3	9	255·5	69·3
2	75·5	110·7	10	255·5	110·7
3	75·5	249·3	11	255·5	249·3
4	75·5	290·7	12	255·5	290·7
5	104·5	69·3	13	284·5	69·3
6	104·5	110·7	14	284·5	110·7
7	104·5	249·3	15	284·5	249·3
8	104·5	290·7	16	284·5	290·7

Eight of these combinations, Nos. 1, 5, 9, 10, 11, 13, 14, and 15 indicate a retrograde or a very rapid direct motion, which is not confirmed by the observations of the last 62 years; therefore these combinations must be rejected as improbable.

Four combinations, Nos. 3, 4, 7, and 8, indicate a very rapid direct motion, which is not confirmed by the observations of the last 62 years; they must also be rejected as improbable.

Finally, the two combinations Nos. 6 and 16 indicate a too small direct motion, which is also not confirmed by the later observations; for the same reason they must also be rejected.

There are left only the two following combinations under Nos. 2 and 12 :—

	1783.	1802.
No. 2	75°·5	110°·7
No. 12	255°·5	290°·7

which indicate a possible direct motion of 35° in 19 years. If we remember that the distance in 1783 is equal to 0″·5 we can only admit the last combination, No. 12. Indeed, the observations of the last 62 years indicate an increase of distance between the components, and when θ will be equal to 75° the distance may be probably 1″·7, but not 0″·5 as it was in 1783. Therefore, only one combination, which is noted under No. 12, can be admitted as the most probable on the supposition that W. Herschel's observations are affected with an error in writing.

N.B.—The distance in 1783 is only an estimate, and may have been as large as 1″·5.

If we add these two observations (combination No. 12) to the observations made during the last 62 years, we obtain the beautiful series of measurements, contained in the following table, in which the angles of position are reduced to the circle of 1900.

Epoch.	θ	σ	Epoch.	θ	σ
	°	″		°	″
1783·18	254·9	±0·5 (est.)	1853·52	13·3	1·3
1802·39	290·2	—	1861·61	20·9	1·3
1825·51	331·4	0·8	1868·57	27·1	1·4
1828·64	341·3	0·8	1877·51	33·6	1·5
1840·55	357·9	1·0	1886·58	42·0	1·5

From these observations we obtain the following system of elements of the orbit :—

T = 1787·9	λ = 152°·5 Eq. 1900
U = 373·5 years	i = 38°·1
n = +0°·9638	e = 0·4424
☊ = 105°·5 Eq. 1900	a = 1″·53

These elements represent very well the above-mentioned observations. The following table contains the comparison of the computed values with the observed :—

Epoch.	θ_o	θ_c	$\theta_o - \theta_c$	σ_o	σ_c	$\sigma_o - \sigma_c$
	°	°	°	″	″	″
1783·18	254·9	251·5	+3·4	±0·5	0·8	—
1802·39	290·2	294·1	−3·9	—	—	—
1825·51	331·4	334·4	−3·0	0·8	1·0	−0·2
1828·64	341·3	339·3	+2·0	0·8	1·0	−0·2
1840·55	357·9	356·4	+1·5	1·0	1·1	−0·1
1853·52	13·3	12·4	+0·9	1·3	1·2	+0·1
1861·61	20·9	20·9	0·0	1·3	1·3	0·0
1868·57	27·1	27·5	−0·4	1·4	1·3	+0·1
1877·51	33·6	35·0	−1·4	1·5	1·4	+0·1
1886·58	42·0	41·8	+0·2	1·5	1·5	0·0

These elements must be certainly considered as a first approximation only.

Observatoire de l'Université Impériale,
St. Petersburg: February 1888.

Southern Double Stars. By the Rev. S. J. Johnson, M.A.

Although there do not seem to be any published measures of southern double stars at very low altitudes in this country, yet there are a few interesting objects which do not deserve to be neglected, and of which measures not quite without value can be got by an observer situated on the extreme south coast of England, if he will watch for the few favourable opportunities of a clear horizon when the star is near its highest attainable altitude in our land. The following are a few specimens of objects of this kind taken with a filar micrometer on a $3\frac{1}{4}$-inch equatorial during the last few years. The mean of four measures in each case is given.

No.	Year.		Position-angle.	Distance.
			°	″
1	1881·92	ω Fornacis	240·3	10·4
2	1882·12	H 3945	66·9	—
3	1886·34	3 (κ) Centauri	109·4	7·6
4	1887·23	ξ Antliæ	209·0	10·0
5	1887·37	*f* Hydræ	189·4	12·4

Distance measurements of (2) could not be got. Very little illumination could be used. The colours of (2) are fine and prominent: red, blue. The companion of 3 (κ) *Centauri* seems to have a bluish tint. Measures of ξ *Antliæ* were rather discordant, but the mean good. The lat. of this place is about 50° 46′ 10″.

Melplash Vicarage, Dorset:
1888, *March* 7.

On the Orbit of 70 (p) Ophiuchi. By J. E. Gore.

As none of the orbits hitherto published for this interesting binary star represent recent measures satisfactorily, I have computed an orbit, using all available measures from 1819 to 1887, about 247 in number, and find the following provisional elements:—

Elements of 70 Ophiuchi.

P = 87·84 years.	Ω = 120° 5′ (1880·0)
T = 1807·65	λ = 171° 45′
e = 0·4912	a = 4″·50
γ = 58° 28′	u = −4°·098